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Grant establishes social work research center

The National Institute of Mental Health (NIMH) has awarded the George Warren Brown School of Social Work a \$3.75 million grant to establish the institute's first Social Work Research Development Center and to fund a major study of the mental health services needed by teenagers.

"This is a major accomplishment for the faculty of the George Warren Brown School and for the field of social work,"

says Dean Shanti Khinduka, Ph.D. "The grant recognizes a growing awareness of the integral role social workers play in the delivery and evaluation of mental health services."

George Warren Brown was one of 14 social work schools vying for the NIMH grant, which will span five years and serve as a model for other centers nationwide. The Research Development Center will be directed by Enola Proctor, Ph.D., professor

of social work. Arlene Stiffman, Ph.D., associate professor of social work, will serve as associate director.

"We think this grant is particularly important because social workers as a group provide more mental health services than any other profession," says Kenneth G. Lutterman, associate director of research training at the NIMH Division of Applied and Services Research.

"Most people with mental health prob-

lems first appear in settings other than the traditional mental health services — in the school, welfare and justice systems," says Lutterman. "This grant will help provide the research that is needed to improve how social workers recognize, diagnose and treat people with mental health problems."

The NIMH is supporting this program, says Lutterman, because it wants social

work research to compete in quality with that being done in psychiatry and psychology. He adds that George Warren Brown's grant proposal was strengthened by the school's existing base of interdisciplinary

research programs, as well as Washington University's general commitment to research.

The NIMH grant responds to recommendations of the National Advisory Mental Health Council, as well as those of a special Task Force on Social Work Research. The NIMH organized the task force in 1989 to study the current state of research development in social work. The task force saw these centers as a means to enhance the understanding and application of scientific research methodologies within the social work profession.

"So much of mental health services are being delivered by social workers these

days, and while we are viewed as effective at delivering services, we generally are not as involved as other health care disciplines in conducting research,"

Khinduka says. "This model

research center will help develop the field's capacity for research. Its goal is to help build a national infrastructure for social work research."

A highlight of the school's proposal, says Lutterman, was the planned involvement of Lee N. Robins, Ph.D., professor of psychiatry at Washington University School of Medicine. "Robins is a world-renowned researcher in this area," says Lutterman. "Her participation in this project is ideal."

The George Warren Brown School, long known for its contributions to public policy

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The woods become a magical place in James Nicholson's new play "Blue Moon Rising," which runs from Dec. 2-5 in the Mallinckrodt Center Drama Studio. The play, presented by the Performing Arts Department, features student actors (from left) Caren Schmulen, junior; Pascaline Rybalka, junior; Ryan Patterson, sophomore; Jeff Gordon, first-year student; Alexander Gish, sophomore; and Alexis Chamow, sophomore. Junior Brad Walker is not pictured. For more information about the play, see page 6.

Seismic waves seen for the first time in 3-D

Hollywood has produced numerous realistic movies depicting the devastation reaped by earthquakes on the Earth's surface. But what happens beneath the surface — way beyond the maximum 13 kilometers down that we've been able to drill — has been relegated to science-fiction tales such as Jules Verne's *Journey to the Center of the Earth*.

One Washington University researcher is about to change all that with his production of the first "movie" to realistically depict the manner in which seismic waves generated by a large earthquake travel throughout the Earth's interior. The computer-generated, animated movie is expected to impact the manner in which geophysics is taught and to serve as a scientific aid in geophysical research.

Michael E. Wyssession, Ph.D., assistant professor of earth and planetary sciences, first presented his movie at the May 1993 meeting of the American Geophysical Union (AGU) in Baltimore, Md. A paper

describing the work, which was authored by Wyssession and Patrick J. Shore, Ph.D., a computer specialist at Washington University, has been accepted for publication in the AGU's *Geophysical Research Letters*.

"Seismologists who have been studying seismic waves for years have been blown away by this movie," says Wyssession. "They've never been able to see them before."

What seismologists normally see are seismograms — one-dimensional records of earthquake tremors calculated at the Earth's surface.

"Seismograms exist as single lines," says Wyssession. "They don't give us any intuitive sense of how the waves look as they travel through the earth."

Calculating the movement

To create his three-dimensional movie, Wyssession had to calculate synthetic seismograms at a grid of locations actually within the Earth.

The Earth's interior comprises three distinct regions — the inner core, an area composed of solid iron; the outer core, composed of liquid iron; and the mantle, composed of rock. The center of the Earth has been calculated to lie 6,371 kilometers (3,959 miles) below its surface.

Earthquakes are described as ruptures or fractures within the Earth. They occur because the Earth's surface, which is broken up into plates, is in constant motion. When the plates move against each other,

Continued on page 8

Author keynotes conference on blacks and Jews

Noted black intellectual Cornel West, author of the best seller *Race Matters*, will give the Mortar Board Lecture at 4 p.m. Thursday, Dec. 2, in Graham Chapel. His lecture, "Blacks and Jews: Conflicts and Coalescence," is part of the Assembly Series and is free and open to the public.

West's talk also keynotes a conference titled "Blacks and Jews: An American Historical Perspective" that will be held at Washington University Dec. 2-5. During the conference, noted scholars from across the country will present and critique papers on topics ranging from blacks, Jews and organized labor in Detroit to the image of blacks in American Jewish letters. Nancy Grant, Ph.D., associate professor of history, is the conference organizer. Gerald Early, Ph.D., professor of English and director of the African and Afro-American Studies Program (AFAS), will serve as a respondent.

Audience participation will be encouraged at the event. There is no charge to attend the conference seminars, which will be held in the Women's Building formal lounge.

West, professor of religion and director of the Afro-American Studies Program at Princeton University, has written eight books that tackle racial and political issues. *Blacks and Jews: Conflicts and Coalescence*, co-authored with Tikkun Magazine Editor Michael Lerner, is forthcoming.

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In This Issue...

Hope for diabetics: Blood pressure drug has been found to dramatically improve fate of diabetics with kidney disease Page 2

Wicked wit: Novelist Stanley Elkin, Ph.D., portrays helplessness, disease and death with humor Page 3

Sabbatical show: Three School of Fine Arts professors display their works in the Gallery of Art Page 5

The Record will not be published during Thanksgiving week. The next issue will be dated Dec. 2. The Record staff wishes everyone a happy and healthy Thanksgiving holiday.

Medical Update

Drug treatment slows progression of diabetic kidney disease

A large international trial has concluded that a drug frequently used to control high blood pressure may dramatically improve the fate of insulin-dependent diabetics with kidney disease. The trial involved researchers from the School of Medicine, Rush-Presbyterian-St. Luke's Medical Center in Chicago and

more than two dozen other centers in North America. The findings were reported in the Nov. 11 issue of *The New England Journal of Medicine*.

"We are very excited about these results," says principal investigator Edmund J. Lewis, M.D., Muehrcke Family Professor of Nephrology at Rush. "Preventing or

delaying the progression of kidney disease can save the lives of patients and delay the need for dialysis and kidney transplantation."

The researchers tested the drug captopril, an angiotensin converting enzyme or ACE inhibitor. Treatment with the drug reduced by 50 percent the risk of

death or rapid progression to end-stage renal disease — characterized by the need for dialysis or kidney transplantation.

Co-investigator Janet McGill, M.D., an assistant professor of medicine at the School of Medicine, says the study provides solid evidence that progression of kidney disease can be slowed in insulin-dependent diabetes. "The benefits of the therapy speak for themselves," McGill says. "We now have therapy that can offer these patients hope for both longer life and better quality of life."

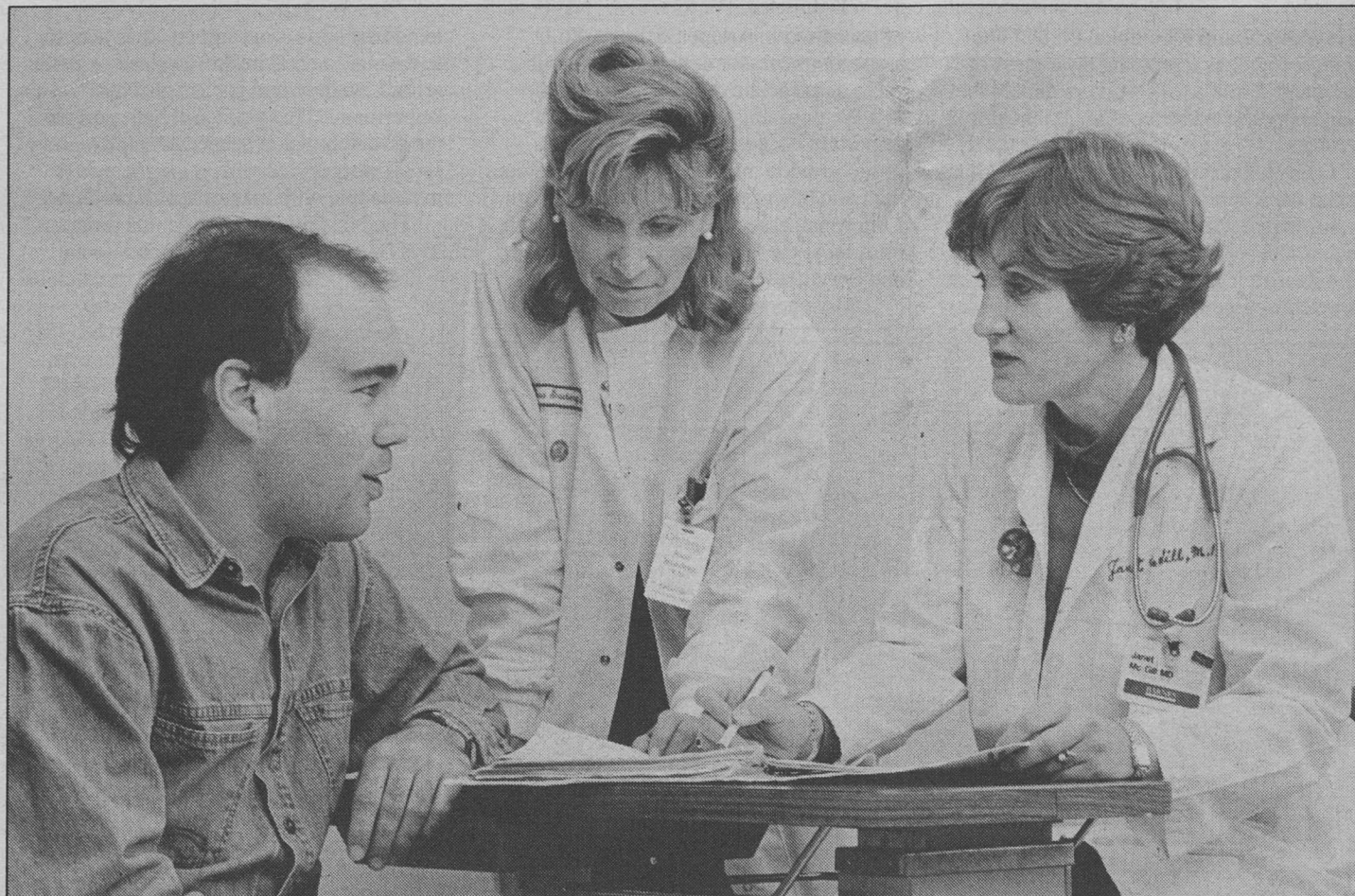
The study was conducted at 30 centers in the United States and Canada. It involved 409 patients between the ages of 18 and 49 who had developed insulin-dependent diabetes before the age of 30. The patients enrolled were diagnosed with early diabetes-induced kidney disease identified by the presence of protein in their urine. About 75 percent of the patient group also had high blood pressure.

Captopril therapy delayed the progression of diabetic kidney disease in all study patients, and the benefit was independent of its blood pressure lowering effect. While all patients with high blood pressure were treated with antihypertensive therapy, those who received captopril experienced improvement in survival and reduced development of end-stage renal disease.

There are more than 14 million people with diabetes in the United States, and 30 to 40 percent develop diabetic nephropathy (kidney disease). More than 200,000 people have end-stage renal disease (ESRD), a condition in which the kidneys fail and patients require dialysis or kidney transplantation. The leading cause of ESRD is diabetes, which accounts for almost 35 percent of new cases.

"The results of this study provide hope to those with early diabetic kidney disease. With proper treatment kidney function can be preserved, and that means a better life for diabetic patients," McGill says.

Additional studies involving diabetes and kidney disease are ongoing. Volunteers, or those interested in more information, should call 362-1000.



Captopril study volunteer Dan Kenner, left, talks to Yona Strasberg, R.N., center, and Janet McGill, M.D., about the encouraging drug trial results.

Finding could help researchers prevent diabetic retinopathy

A tiny crystal may tell researchers how to stop the ravages of diabetic retinopathy, a condition that afflicts nearly one million people and causes blindness in 5,000 annually.

In this month's *Proceedings of the National Academy of Sciences*, researchers from the School of Medicine and Howard Hughes Medical Institute at Baylor College of Medicine in Houston reported the first successful efforts to determine the three-dimensional structure of an enzyme long thought to be a culprit in diabetic retinopathy.

The team grew crystals of the protein with a bound drug — zopolrestat — to get "molecular snapshots" of the enzyme, aldose reductase. These snapshots will allow scientists to visualize the enzyme and improve the drug that appears to block the enzymatic cascade thought to cause blindness in some diabetic patients.

The idea of targeting aldose reductase is not entirely new. Aldose reductase is present in large quantities in the eye. It also can be found in kidneys and nerve cells, and many researchers believe it is linked to the complications of diabetes leading to kidney failure and nerve degeneration. The enzyme is involved in glucose metabolism, but its precise role in diabetic retinopathy is the matter of some debate, says J. Mark Petrash, Ph.D., an assistant professor of ophthalmology and visual sciences at the School of Medicine.

Inhibiting aldose reductase

Though scientists do not yet understand the precise mechanisms involved in diabetic retinopathy, Petrash argues that by inhibiting aldose reductase — which could be the key enzyme in the disease process — the mechanism that results in retinopathy either can be stopped or significantly altered. Animal studies have shown that inhibiting aldose reductase is very effective in preventing complications of diabetes, including eye disease. "That's why we've focused most of our effort on that enzyme," he says.

Petrash's search began when he successfully cloned the aldose reductase gene. His research team was able to insert the human aldose reductase gene into a bacterium and make large amounts of the enzyme with the genetically engineered bacteria. The Baylor team then produced the crystals of the enzyme with the bound inhibitor, knowing that they would provide the key information about the enzyme's molecular architecture required to make even more potent inhibitors.

Petrash says an effective inhibiting drug could be a small pill that would be

The enzyme is involved in glucose metabolism, but its precise role in diabetic retinopathy is the matter of some debate.

— J. Mark Petrash

taken once a day. Drugs tested in past clinical trials often have required dosage three or four times daily. "That's just not feasible for somebody who might be taking the drug for 30 or 40 years," Petrash explains. He believes the best treatment might be a mixture of inhibitors in one pill.

Petrash is leaving the design of better drugs to pharmaceutical companies so that he can continue his studies of the aldose reductase enzyme. A recent unrelated discovery has caused Petrash to shift his focus. One of his colleagues, James C. Warren, M.D., Ph.D., a professor emeritus in the departments of Obstetrics and Gynecology and Biochemistry and Molecular Biophysics at the

School of Medicine, has found something that could mean aldose reductase has a more complex metabolic role than previously understood. Warren has linked the enzyme to steroid metabolism.

New findings about the enzyme

Warren has spent years studying a class of enzymes called hydroxy-steroid dehydrogenases. Last year he isolated a gene from cow tissue he was studying that turned out to be the same gene Petrash had discovered for aldose reductase.

"We were literally footsteps apart," Petrash says. "His work was not related to mine at all. I was working with an enzyme that metabolizes sugars. He was studying steroid metabolism, but we found the same gene."

So far, Petrash does not understand the enzyme's role in steroid metabolism, but he says it does have many of the properties required for steroid reactions.

Ironically, the enzyme's possible role in steroid metabolism could complicate efforts to test aldose reductase inhibitors in the clinic. To effectively inhibit aldose reductase and prevent diabetic retinopathy, drugs would be prescribed as soon as possible after diagnosis of diabetes — possibly before puberty. The problem arises because if aldose reductase plays a normal role in the multitude of steroid and hormonal changes that take place in adolescents, inhibiting the enzyme could create problems in development. On the other hand, waiting until adulthood to give the inhibiting drugs could result in prescribing treatment too late to effectively prevent retinopathy.

Petrash says further studies are needed, but he sees no reason to delay clinical trials of the new inhibiting drug zopolrestat. He believes, however, that such trials should be restricted to adults until the normal function of the enzyme is better understood.

— Jim Dryden

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Washington
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Washington People

Elkin tightropes from comedy to tragedy

Wielding political power has never been the ambition of novelist Stanley Elkin. Offer him the power of omniscience, the knack for know-it-all, and watch his face brighten. It's the cloak-and-dagger stuff that charms Elkin. Secrets. The inside scoop. And he's gone to great lengths, even politically campaigned, to achieve it.

Eager to be elected to the Department of English Executive Committee in the mid-1960s, Elkin conjured up what he deemed a brilliant campaign strategy: treat the junior faculty to lunch at a neighborhood restaurant. Well into the meal, when slaked thirst and sated appetite had endeared him to his guests, the gracious host would solicit the vote of all present.

"I wanted to know where the bodies were buried," Elkin explains. "And that's where [on the executive committee] I thought I could best find out what other people were making." But it proved lean cuisine for the then associate professor. "I never did get elected," Elkin deadpans. "I got one vote ... my own."

The ill-fated lunch notwithstanding, Elkin brandishes, in the world of fiction, a formidable power with a style all its own. The Merle Kling Professor of Modern Letters, critically acclaimed author of 16 books — nine novels and seven collections of shorter works — Elkin displays a love for language in the rich prose, magic metaphor and comic infusions that characterize his work.

"Stanley has a caricaturist's eye, wickedly aimed, and he catches the buffoonish gestures of his America with a blend of the disgusted and the enchanted," wrote Harvard Professor Helen Vendler in the introduction to *Pieces of Soap*, Elkin's 1992 collection of essays. The two shared an office and typewriter at Smith College nearly 20 years ago, when Elkin was a visiting lecturer there.

The worlds of Stanley Elkin are populated with a menagerie of characters: slick-talking salesmen; threatening funeral directors; jilted professors; terminally ill children, the down-trodden more often than not. His themes include helplessness, powerlessness, disease and death.

Elkin's modus operandi? He layers tragedy and comedy into a swirling parfait laced with all the syrups of a confectionary. It's a style that sticks to the teeth.

"The combination of how he looks at things so brutally directly yet also with this amazing playful humor comes up over and over again in his writing and teaching," says former student Elizabeth Graver.

"I just read *Her Sense of Timing*, in which he dealt so directly with MS. (Elkin was diagnosed with multiple sclerosis in 1972.) Parts of that novella are incredibly funny, like the scene where he's talking about the different types of fleece. He catalogs. He's almost anthropological in that way. He'll take any text and do this minute, extremely perceptive and usually very funny cataloging."

The cited passage comes from Elkin's trio of novellas titled *Van Gogh's Room at Arles*, published last spring. Geography Professor Jack Schiff, the wheelchair-bound protagonist, begins to daydream shortly after his wife unexpectedly walks out on him:

"He found himself idly thinking about the sheepskin whoosies crips draped over the furniture and across their wheelchairs and sheets to help prevent lesions and bedsores. It was astonishing what one of those babies could go for in a wicked world. (It varied actually. They came in different grades, like wool rugs, fur coats, or diamonds. Lambskin was the most expensive, then ewes, then adult males, but it wasn't that simple. There were categories within even these categories, and certain kinds of sheep — castrated fully-grown males were an example — could sometimes be more expensive than even the finest virgin lambskin. Once you really got into it, it was a waste, a waste and a shame, thought Schiff, to be crippled up in such an interesting place as the world.) Oh well, he thought, if he really needed them he could afford all the sheepskins he wanted. Sheepskin deprivation wasn't his problem."

Elkin is a force to be reckoned with in the classroom as well. "He can be intimidating," says Graver, now a visiting assistant professor at Boston College and author of a short story collection. "He is a compassionate and kind person, but he has a gruff wit, which kept us on our toes."

The same trademark wit once compelled students attending a Vermont writers workshop to name the cabin where the novelist resided "the dragon's den." If he is harsh in his critiques — those in his workshop have been known to tremble in the wake of his comments — it is because he casts an unrelenting eye upon the work. Students such as Matt Leibel, a Writing Program candidate from Irvine, Calif., "welcome the opportunity to have the work discussed on such a high level — to get that kind of critical feedback."

"He has an incredible sense of voice and language," Graver adds. "His desire, which you can see in his own work, is to push things to extremes and see where they'll take you, in terms of both the sentence and the situation. He is a master of metaphor, a meticulous editor. He was a very good teacher for me."

Elkin's metier seems inherently self-directed. For a writer who has "had more editors than most people have

read. I read for 38 hours and finished the book and the course 20 minutes before the store opened up.

"It wasn't until afterward, after I left the store, that I smelled the smells, tasted them, the naphthas and benzines, the agents and solvents, Clark Street and Dublin suddenly all mixed together, coating my mouth like sore throat, swabbing my throat like pus, stinging my eyes like chemical warfare. I had a headache that would last days, an olfactory hyperesthesia that would actually return full blown when I visited Dublin 16 years later. Hey, I was like Bloom in *Nighttown*, like Proust in the cookie jar, the disparate impressions of laundry and literature like things bonded in genes."

"There is a bit of Bloom in Stanley," offers colleague and close friend Naomi Lebowitz. "What makes Stanley so disarming is that he's given up on defensiveness as a legitimate mental move. The completeness of his expression doesn't have to fight its way through this double battle of offense and defense. It has a direct route out. The humor comes out of this business of having no defense mechanisms. For this reason, it would be utterly impossible to put Stanley on a psychiatric couch."

"Humor is one of the big weapons that Kafka and Joyce turn to when they're threatened with self-pity, the one thing literature cannot stand," offers Lebowitz, Ph.D., professor of English and Hortense and Tobias Lewin Distinguished Professor in Humanities. "Stanley is wonderful at that. By drawing on a personal magic realism — Stanley has no political agenda — he explores, through humor, the origins and journeys of our pain. He is a great poet of our pain."

From the University of Illinois, where he earned his bachelor's, master's and doctoral degrees, Elkin came to Washington in 1960 as an instructor in the English department. By the end of the decade, he had attained the title of full professor and published his first two novels, *Boswell* (1964) and *A Bad Man* (1967), and a collection of short stories, *Criers and Kibitzers*, *Kibitzers* and *Criers* (1965).

Has the writing through the years grown easier? "Yes. I remember writing short stories as a graduate student and struggling, struggling," Elkin says. "I was using a ream of paper for one short story. Since I published *George Mills*, it's become relatively easier."

Seven years in the making, *George Mills* marked a banner year for its creator. A 1,000-year sweep of history that details the adventures of the luckless Mills family, the novel won the National Book Critics Circle Award in 1982. (Three other books — *The Dick Gibson Show*, *Searches and Seizures* and *The McGuffin* — were nominated for the National Book Award in fiction.) The critics' rap that had befallen Elkin's earlier works, that he was all style and no plot, had abated.

That same year, Elkin was elected a member of The American Academy of Arts and Letters. His ability "to tightrope his way from comedy to tragedy with hardly a slip," as one reviewer wrote in the *Los Angeles Times*, had scaled new heights. Elkin himself felt that he had reached the top of his act.

"I thought it [*George Mills*] was the best book I'd ever written and thought at the time that I wouldn't write any more novels," Elkin recalls. "I thought I couldn't do any better." Before he could complete *George Mills*, however, his muse reappeared.

From the fast and furious wheels of his imagination rolled a string of subsequent works: *The Magic Kingdom* (1985); *The Rabbi of Lud* (1987); *The McGuffin* (1991); *Pieces of Soap* (1992); and *Van Gogh's Room at Arles* (1993). Sharing the shelf are a book of *Early Elkin* (1985); "Notes Toward a Eulogy for Joan Cohen" (1986-87), a ballet commissioned by the Mid America Dance Company; a limited edition of "The Coffee Room" (1986), a radio script first published in *Epoch*, fall 1980, then broadcast nationally; "The Six-Year-Old Man" (1987), a screenplay; and a spate of articles that have appeared in *Harper's*, *New York Times Book Review*, *Chicago Review*, *Esquire* and other magazines.

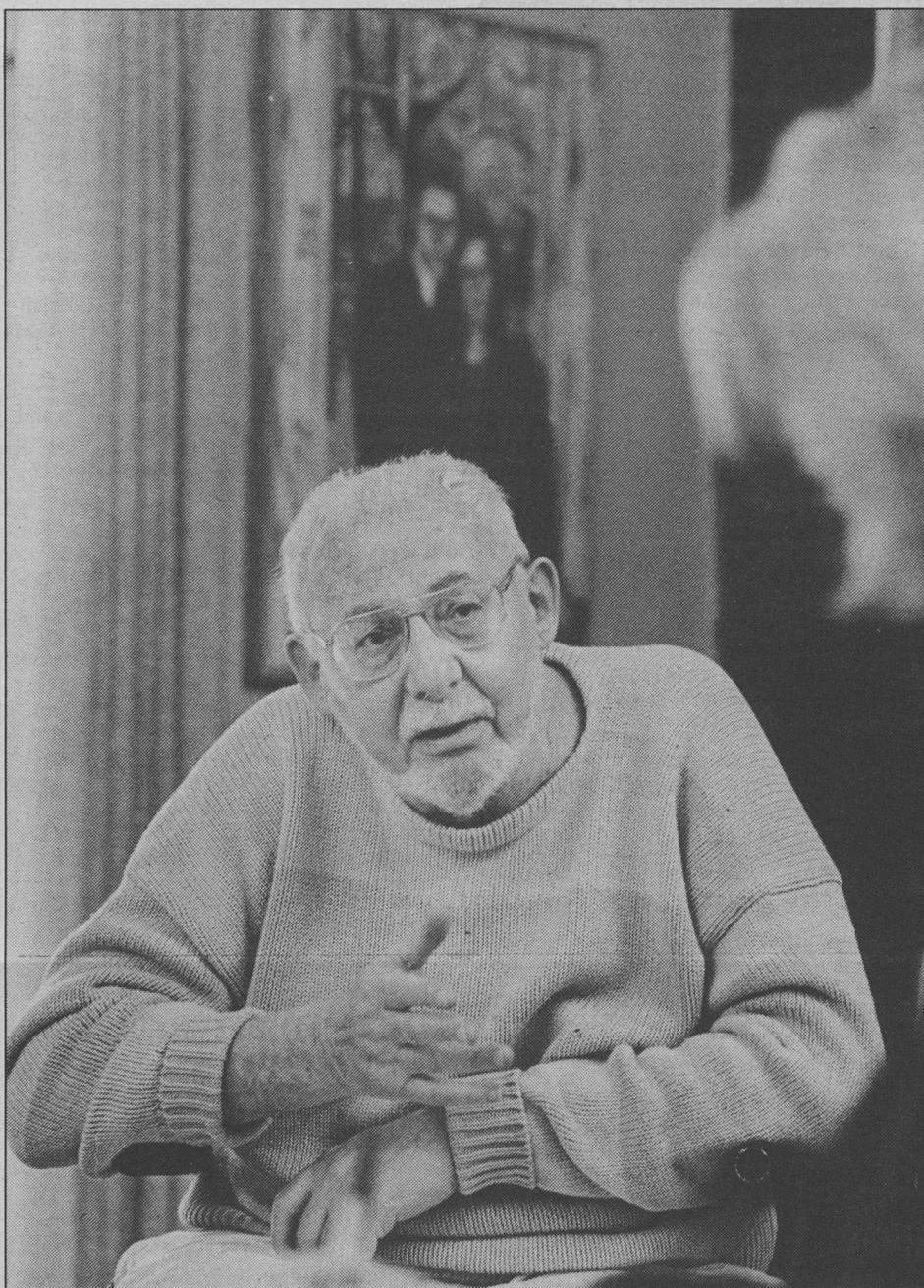
Elkin's publications from the 1970s included the novels *The Dick Gibson Show* (1971), *The Franchiser* (1975), and *The Living End* (1979), and a book of three stories, *Searches and Seizures* (1975).

Mrs. Ted Bliss, a novel-in-progress, is due to its publisher, Hyperion, in March 1995.

Dismissing all of the labels — satire, black humor, metafiction — that have been fixed to his work, Elkin says his novels are, for the most part, psychological.

The writer's imagination, he has written, is his license "to legislate the infinite details of the world, to inventory the vast holdings of the human heart and work its combinations like a safecracker ..."

—Cynthia Georges



"I'd rather make things up.
The more I know, the less free
I am. So, I write my novels
out of pure ignorance."

had hot dinners — they usually get fired on me, or die, or move to other jobs" — Elkin rarely sees copy changes on his own manuscripts.

And he never researches his work. "If I have to serve the subject, the writing dies. Besides, I'd rather make things up. The more I know, the less free I am. So, I write my novels out of pure ignorance."

As a youth growing up in Chicago, Elkin read few books. It was his father, a traveling jewelry salesman for Coro Co., who first inspired him with a sense of story. "He always came back with wonderful tales of odd things that happened to him on the road," Elkin told an interviewer on National Public Radio. "He was a very spontaneous man. I never heard him repeat a story. In terms of the intellectual, nothing ever happened to me until I went to college. Then, suddenly, the world lit up for me."

In "Where I Read What I Read," an essay first published in *Antaeus*, spring/summer 1982, and reprinted 10 years later in *Pieces of Soap*, Elkin writes of this intellectual engagement. It is Labor Day weekend in 1953. Elkin the student has volunteered to be the substitute watchman at the Peacock Laundry and Dry Cleaners, his summer employer in Chicago. There, he decided to tackle Joyce's *Ulysses*, the one book he had yet to read for a literature course at Northwestern.

"I don't read sitting up and there was no place for a night watchman to lie down. In the back, though, were long tables, and I chose one of these, under a light like a fixture in a pool hall. There ... pillowed on wet wash, [I] began to

Calendar

Nov. 18–Dec. 4



Exhibitions

"Recent Acquisitions: Rare Books and Manuscripts Added to Special Collections." Through December. Olin Library, Special Collections, Level Five. Hours: 8:30 a.m.-5 p.m. weekdays.

"On Sabbatical: School of Fine Arts Faculty Work." Exhibit opening: 5 p.m. Nov. 19. Exhibit continues through Jan. 3. Gallery of Art, upper gallery, Steinberg Hall. Hours: 10 a.m.-5 p.m. weekdays; 1-5 p.m. weekends.

"Into the Light: Gay, Lesbian and Bisexual Student Show." Through Dec. 15. Bixby Gallery, Bixby Hall. Hours: 10 a.m.-4 p.m. weekdays; 1-5 p.m. weekends.



Films

Thursday, Nov. 18

7 and 9 p.m. Filmboard Classic Series. "Butch Cassidy and the Sundance Kid." Room 100 Brown Hall. Cost: \$3. For 24-hour Filmboard hotline, call 935-5983.

Tuesday, Nov. 30

7 p.m. Japanese Film Series. "Dreams," with English subtitles. Room 219 South Ridgley Hall.

Wednesday, Dec. 1

7 and 9 p.m. Filmboard Foreign Series. "Pather Panchavi," in Hindi with English subtitles. (Also Dec. 2, same times.) Room 100 Brown Hall. Cost: \$3.

Friday, Dec. 3

7 and 9:30 p.m. Filmboard Feature Series. "A Christmas Story." (Also Dec. 4, same times.) Room 100 Brown Hall. Cost: \$3.

Midnight. Filmboard Midnight Series. "Porky's." (Also Dec. 4, same time.) Room 100 Brown Hall. Cost: \$3.



Lectures

Thursday, Nov. 18

10 a.m. Graduate student thesis defense. "Calorimetric and NMR Studies of Sulfonyleurea-Albumin Interactions: Implications for Type II Diabetes," Michael Jakoby, graduate student. Room 2918 South Bldg.

Noon. Genetics seminar. "Differentiation Versus Proliferation in the Control of *C. elegans* Germline Development," Tim B. Schedl, asst. prof., Dept. of Genetics. Room 816 McDonnell Medical Sciences Bldg.

Noon. Markey Special Emphasis Pathway in Human Pathobiology seminar. "Non-nucleoside HIV-1-Specific Reverse Transcriptase Inhibitors," Gary Tarpley, Division of Cancer and Infectious Diseases Research Groups, The Upjohn Co., Kalamazoo, Mich. Room 3723 West Bldg.

Noon. Pediatrics research seminar. "Sorting at the cis-Golgi Network: Insights Into the Regulation of Intracellular Traffic," Victor Wee Hsu, Dept. of Cell Biology and Metabolism, National Institute of Child Health Development and National Institutes of Health. Third Floor Aud., St. Louis Children's Hospital.

1:10 p.m. George Warren Brown School of Social Work lecture. "After the Flood: Coping With Emotional Crisis," Elizabeth Smith, assoc. prof., social work in psychiatry. Brown Hall Lounge.

4 p.m. Biology and biomedical sciences student-organized seminar. "Mechanism and Regulation of Vesicle Budding Early in the Secretory Pathway," Randy Schekman, prof., Dept. of Molecular and Cell Biology, U. of California, Berkeley. Erlanger Aud., McDonnell Medical Sciences Bldg.

4 p.m. Central Institute for the Deaf Research Seminar. "Stimulus Variability and Spoken Word Recognition," Mitch Sommers, asst. prof., Dept. of Psychology. Second Floor Aud., Clinics and Research Bldg.

4 p.m. Chemistry seminar. "Atomic Force Microscopy — Developments and Perspectives in Exploiting and Modifying Inorganic and Organic Nanostructures," Tomasz Kowalewski, postdoctoral research assoc., Dept. of Chemistry. Room 311 McMillen Lab. (Coffee: 3:40 p.m. outside Room 311.)

4 p.m. History talk. "Authentic Reproductions: Historicizing Bibliography," Joseph Loewenstein, assoc. prof. and chair of English. Cohen Lounge, Room 113 Busch Hall.

4:15 p.m. Philosophy-Neuroscience-Psychology Program colloquium. "Using Neuroimaging in Cognitive Neuroscience: Studies of Attention and Language," Steve Petersen, assoc. prof., Dept. of Neurology and Neurological Surgery. Stix International House living room.

4:30 p.m. Math colloquium. "Cyclic Homology and Hodge Theory," Charles A. Weibel, Rutgers U., New Brunswick, N.J. Room 199 Cupples I Hall. (Tea: 4 p.m., Room 200.)

Friday, Nov. 19

9:15 a.m. Pediatric Grand Rounds. "The Neonate With Congenital Heart Disease: A Surgical Challenge," Aldo Castenada, William E. Ladd Professor of Child Surgery, Harvard Medical School, Boston. Clopton Aud., 4950 Children's Place.

10 a.m. Electrical engineering seminar. "The Linearity of Several Notorious Families of Nonlinear Binary Codes," A. R. Calderbank, dept. head, Mathematical Sciences Research Center, AT&T-Bell Labs. Room 305 Bryan Hall.

Noon. Cell biology and physiology seminar. "Fibrillin: A Molecule Responsible for Long Bones and Weak Arteries," Robert Mecham, prof., Dept. of Cell Biology and Physiology. Room 423 McDonnell Medical Sciences Bldg.

Noon. Environmental seminar. "Investigation of Remediation of Gasoline Beneath the Town of Hartford, Illinois: A Case Study," C. George Lynn, Burlington Environmental. Co-sponsored by the School of Engineering and Applied Science and the Electric Power Research Institute. Room 216 Urbauer Hall.

3 p.m. Math colloquium. "How To Determine the Regularity of a Refinable Function," Ingrid Daubechies, prof., Rutgers U. Bell Labs, New Brunswick, N.J. Room 199 Cupples I Hall. (Tea: 2:30 p.m., Room 200.)

4 p.m. Anatomy and neurobiology seminar. "Cell Renewal in Skeletal Muscle," E. Richard Bischoff, assoc. prof., Dept. of Anatomy and Neurobiology. Room 928 McDonnell Medical Sciences Bldg.

4 p.m. Hematology-oncology seminar. "Modeling Normal and Leukemic Hematopoiesis in SCID (severe combined immunodeficiency) Mice," John Dick, assoc. prof. of genetics, U. of Toronto. Room 7738 Clinical Sciences Research Bldg.

4 p.m. Music lecture. "Johann Mattheson and John Locke: *Sensus vindicatae*," Darrell Berg, visiting assoc. prof. of music. Room 8 Blewett Hall Annex.

Saturday, Nov. 20

9 a.m. Saturday morning neural science seminar — ION CHANNELS: Update on Molecular and Physiological Characteristics. "Structural and Functional Diversity of Calcium Channels," Kurt Beam, Colorado State U., Fort Collins. Erlanger Aud., McDonnell Medical Sciences Bldg.

Monday, Nov. 22

Noon. Molecular biology and pharmacology seminar. "The IEG Seismograph: A

Monitor of Cellular Stress," Jeffrey D. Milbrandt, assoc. prof., Dept. of Medicine and assoc. prof., Dept. of Pathology. Room 3907 South Bldg.

2 p.m. Plant biology program thesis defense. "Molecular Mechanism of Gene Regulation by the Phytohormone Abscissic Acid," Oingxi Shen, graduate student. Room 322 Rebstock Hall.

4 p.m. Immunology seminar. "Regulation of B Cell Proliferation by IL-14," Julian L. Ambrus, assoc. prof., Dept. of Medicine, and assoc. prof., Dept. of Pathology. Third Floor Aud., St. Louis Children's Hospital.

4 p.m. Institute for Biomedical Computing and Biomedical Engineering program. "Expert Systems for Infection Control Surveillance and Hospital Quality Assessment," Michael G. Kahn, asst. prof., Dept. of Medicine and asst. prof. and director, Medical Informatics Group, Teaching and Research divisions. Cori Aud., 4565 McKinley Ave.

4 p.m. Social Thought and Analysis colloquium. "A Peculiar State? Politics and Society in Late Imperial China and Western Theory," Bin Wong, assoc. prof. of history, U. of California, Irvine. Room 149 McMillan Hall.

8 p.m. Architecture lecture. "Recent work," Enric Miralles, architect, Barcelona, Spain. Steinberg Hall Aud. (Reception following, Room 120 Givens Hall.)

Tuesday, Nov. 23

4:30 p.m. Anthropology colloquium. "Cahokia: Perspectives, Perceptions and Prospects on a Complex Chiefdom," John E. Kelly, research assoc., Dept. of Anthropology and staff archaeologist, Contract Archaeology Program, Southern Illinois U., Edwardsville. Room 149 McMillan Hall. (Coffee: 4:15 p.m.)

Wednesday, Nov. 24

7:30 a.m. Obstetrics and Gynecology Grand Rounds. "Apoptosis in the Ovary," Valerie Ratts, Reproductive Endocrine Fellow, Johns Hopkins U., Baltimore. Clopton Aud., 4950 Children's Place.

Monday, Nov. 29

4 p.m. Biology seminar. "Measuring Evolutionary Parallelism: The Case of the New World and Old World Anthroids," David Tab Rasmussen, assoc. prof., Dept. of Anthropology. Room 322 Rebstock Hall.

4 p.m. Immunology seminar. "Coreceptor Function in Thymocyte Selection," Dan Littman, assoc. prof., Dept. of Microbiology and Immunology, U. of California, San Francisco. Third Floor Aud., St. Louis Children's Hospital.

5 p.m. University College lecture. "Assessment of Leadership and Its Impact," David Campbell, Senior Fellow of the Center for Creative Leadership, Greensboro, N.C. Brown Hall Lounge.

Tuesday, Nov. 30

12:10 p.m. Brown Bag Research Seminar. "Ergonomics and Cumulative Trauma Disorders: Light at the End of the Carpal Tunnel," Scott Minor, asst. prof., Program in Physical Therapy. Classroom C, Room 110 Boulevard Bldg.

12:30 p.m. Molecular microbiology seminar. "Identification of Virulence Genes in the Protozoan Parasite Leishmania by Functional Complementation," Stephen Beverley, prof., Biological Chemistry and Molecular Pharmacology Dept., Harvard Medical School, Boston. Cori Aud., 4565 McKinley Ave. (Refreshments: 12:15 p.m.)

Wednesday, Dec. 1

7:30 a.m. Obstetrics and Gynecology Grand Rounds. "Fetal Behavior and Activity," Robert Ball, instructor, Dept. of Obstetrics and Gynecology. Clopton Aud., 4950 Children's Place.

4 p.m. Biochemistry and molecular biophysics seminar. "The Interaction of Steroid Receptors With Chromatin," Gordon L. Hager, Hormone Action and Oncogenesis Section, National Cancer Institute, National Institutes of Health. Cori Aud., 4565 McKinley Ave.

4 p.m. Physics colloquium. "MNR of Physisorbed and Matrix-isolated HD," Richard E. Norberg, prof., Dept. of Physics. Room 204 Crow Hall. (Coffee: 3:30 p.m., Room 245 Compton Hall.)

Thursday, Dec. 2

4 p.m. Assembly Series lecture. "Blacks and Jews: Conflicts and Coalescence," Cornel West, prof. of religion and director, Afro-American Studies Program, Princeton U. and author of eight books, including *Race Matters*. Graham Chapel. The talk is the keynote lecture of the conference on "Blacks and Jews: An American Historical Perspective." (Conference continues through Dec. 5.) Sponsored by African and Afro-American Studies Program, American Culture Studies Institute, Jewish and Near Eastern Studies, and departments of History, Education, and Political Science. Women's Bldg. Lounge. For cost and registration info., call 935-5690.

4 p.m. Chemistry seminar. "Methods for the Preparation of Large Chemical Libraries," Michael C. Pirrung, assoc. prof. of chemistry, Duke U., Durham, N.C. Room 311 McMillen Lab. (Coffee: 3:40 p.m. outside Room 311.)

4 p.m. Earth and planetary sciences colloquium. "Cosmogenic Isotopes and Their Application to Land Form Evolution: A Test Case — The Grand Canyon Debris Flows," Marc Caffee, physicist, Center for Accelerator Mass Spectrometry, Lawrence Livermore National Laboratories. Room 162 McDonnell Hall.

4:15 p.m. Philosophy colloquium. "Quine and Wittgenstein: The Odd Couple," Burton Dreben, prof. of philosophy, Harvard U., and Boston U., Boston. Hurst Lounge, Room 201 Duncker Hall.

4:30 p.m. Math colloquium. "Vector Bundles on Projective Spaces," Mohan Kumar, prof. of mathematics. Room 199 Cupples I Hall. (Tea: 4 p.m., Room 200.)

8 p.m. Art lecture. "Testimonies in the Valley," William Kohn, painter and prof. of fine arts. Steinberg Hall Aud.

Friday, Dec. 3

Noon. Cell biology and physiology seminar. "Yeast Mitosis: In Vivo and In Vitro," Douglas Koshland, prof., Dept. of Embryology, Carnegie Institute, Baltimore. Room 423 McDonnell Medical Sciences Bldg.

Noon. Environmental seminar. "The Occurrence of Agricultural Herbicides in Missouri River Water and Their Impact on Water Supply," Terry L. Gloriod, St. Louis County Water Co. Co-sponsored by the School of Engineering and Applied Science and the Electric Power Research Institute. Room 216 Urbauer Hall.

1 p.m. Solid-state engineering and applied physics seminar. "Fingerprinting Magnetic-recording Media," E. Glavinias, electrical engineering graduate student. Room 305 Bryan Hall.



Music

Saturday, Nov. 20

8 p.m. Edison Theatre "OVATIONS!" Series presents The Philharmonia Baroque Orchestra. The concert, directed by Nicolas McGegan, features guest artist Seth Carlin on the fortepiano. Edison Theatre. Cost: \$25 for the general public, senior citizens and WU faculty and staff; \$20 for students. For more info., call 935-6543.

Sunday, Nov. 21

3 p.m. Wind Ensemble and Chamber Winds concert. The concert, directed by Dan Presgrave, features the music of W. A. Mozart, F. Devereze, V. Ewald, R. Washburn and F. J. Haydn. Graham Chapel.

8 p.m. Contemporary music program with The New Music Circle. Performance features "Zeitgeist," with Jay Johnson, vibraphone and percussion; Joe Holmquist, marimba and percussion; Bob Samartotto, clarinet and saxophone; Tom Linker, piano and synthesizer. Hosted by Gallery of Art. Steinberg Hall Aud. Cost: \$10 for the general public; \$6 for students. For ticket info., call 935-5574.

Monday, Nov. 22

8 p.m. WU Chorus concert. Program directed by Robert Ray and features Antonio Vivaldi's "Gloria." Graham Chapel.

Monday, Nov. 29

8 p.m. Graduate student piano recital. Pianist David Wang will perform works by J. S. Bach, F. Chopin, A. Copland and J. Sun. Graham Chapel.

Tuesday, Nov. 30

8 p.m. Violin recital. Violinist Allison Harney of the Saint Louis Symphony Orchestra and pianist Judith Gordon, Boston, Mass., will perform the music of L. van Beethoven, B. Bartok, G. Fauré and M. de Falla. Steinberg Hall Aud.

Wednesday, Dec. 1

8 p.m. Violin recital. Program features violinist Heidi Turner and includes the music of J. S. Bach, L. van Beethoven, C. Franck, A. Schoenberg and P. Sarasate. Graham Chapel.

Saturday, Dec. 4

1-5 p.m. Piano students' recital. Conducted by Kathi Kurtzman, applied music instructor. Steinberg Hall Aud.

8 p.m. WU Chamber Choir performance. Program, directed by John Stewart, includes "Ceremony of Carols" and "Alto Rhapsody," and features soloist Denise Stookesberry, graduate student, Dept. of Music. Graham Chapel.

**Performances****Sunday, Nov. 21**

2 and 4 p.m. Edison Theatre "ovations! for young people" Series presents "Riders in the Sky," a trio of Western musical entertainers that provide family entertainment. Audience members are encouraged to wear their favorite cowboy or cowgirl outfits to the performance. Edison Theatre. (Following the 4 p.m. performance, join the "Riders" for a chuck wagon dinner at the Whittemore House. Proceeds for the dinner benefit Friends of Edison. Dinner tickets, which must be purchased in advance, are \$15 for children and \$18 for adults.) For more info., call 935-6518.

Thursday, Dec. 2

8 p.m. WU Performing Arts Dept. presents "Blue Moon Rising," an original play written by James Nicholson, playwright-in-residence, and directed by Melanie Dreyer, lecturer in performing arts and founder of ShatterMask, a local theater company. (Also Dec. 3 and 4, same time.) Cost: \$7 for the general public; \$5 for senior citizens, WU faculty, staff and students. Drama Studio, Room 208 Mallinckrodt Center. For more info., call 935-6543.

**Miscellany****Thursday, Nov. 18**

8:30 a.m. NASA Origins of Solar Systems Program. "Workshop on Isotopic Anomalies: Interstellar Grains in the Laboratory." (Continues through Nov. 20.) May Aud., Simon Hall. For cost and registration info., call 935-6240.

8 p.m. English colloquium. "Naming Names: Laura Riding Reading Gertrude Stein," presented by Steven Meyer, asst. prof., Dept. of English. Hurst Lounge, Room 201 Duncker Hall. For more info., call 935-5190.

Friday, Nov. 19

10 a.m.-8 p.m. Annual Staufen's piano sale in the former Boyd's Store on West Campus. (Also noon-8 p.m. Nov. 20 and 11 a.m.-6 p.m. Nov. 21.) Sponsored by Dept. of Music. For more info., call 394-5050.

11 a.m.-2 p.m. Gathering to prepare food for the homeless. All are invited to help make peanut butter and jelly sand-

wiches for homeless shelters. Sponsored by Marriott Food Services, Student Union, the Campus Y, S.T.E.P. (Students Together to End Poverty) and AHA (Adequate Housing for America). "Green chair" area of Mallinckrodt Center. For more info., call 935-5010.

4 p.m. Performing Arts and Study Abroad Office information meeting. Information about "Shakespeare's Globe," theatre study in London, and the summer theatre institute and availability of fall semester theatre internships. Room 208 South Brookings Hall.

7:30 p.m. African Arts Festival. A celebration focusing on East African culture and the influence of Africa on Brazil. Festival, which begins at 7:30 p.m. Nov. 19, features a variety of activities and entertainment. (Continues through Nov. 21.) Events will take place throughout the St. Louis area. For more info. about events and costs, call 935-5645.

Saturday, Nov. 20

7:15 a.m. Office of Continuing Medical Education seminar. "Management of Hypercholesterolemia: Goals and Strategies." Marriott Pavilion Hotel, St. Louis. For cost and registration info., call 362-6893.

7:30 p.m. Benefit concert for the homeless. Presented by S.T.E.P. (Students Together to End Poverty) and AHA (Adequate Housing for America). Bands include "The Scholars," "SOAP," "Secret Cajun Band" and "Sinister Dane." Event sponsored by Pointers Pizza, Pepsi, Campus Y and Student Union. Sound system by Luther Hall. Free pizza and soda provided. Admission cost: A canned good, cleaning supply or \$2 donation to homeless shelters. The Gargoyle, Mallinckrodt Center.

Monday, Nov. 22

8 p.m. International Writers Center poetry reading. Ben Okri, Nigerian novelist and author of *Songs of Enchantment*, reads from his works. (Booksigning will follow.) Edison Theatre. For more info., call 935-5576.

Tuesday, Nov. 23

11 a.m.-5 p.m. WU Police Dept. Open House. WU community, friends and neighbors are encouraged to attend. Building tours will be given, and refreshments will be served. University Police Facility, 6930 Millbrook Blvd.

Wednesday, Dec. 1

5:30 p.m. Financial aid workshop. Ellen Krout Levine, coordinator of Career Programs, will lead the workshop. Sponsored by University College and the Financial Aid Office. Room 30 January Hall. For more info., call 935-6777.

Friday, Dec. 3

7:30 a.m. Office of Continuing Medical Education seminar. "Women's Healthcare Issues '93." Ritz-Carlton Hotel, St. Louis. For cost and registration info., call 362-6893.

6 and 8:30 p.m. WU Association Travel Lecture Series. "Amazing Australia," with Grant Foster, director-camera operator of award-winning documentaries and travel films. Graham Chapel. Cost: \$4.50 at the door.

Saturday, Dec. 4

7 a.m. Office of Continuing Medical Education seminar. "Current Management of Hepatic and Biliary Disease." Ritz-Carlton Hotel, St. Louis. For cost and registration info., call 362-6893.

Calendar guidelines

Events sponsored by the University — its departments, schools, centers, organizations and its recognized student organizations — are published in the Calendar. All events are free and open to the public, unless otherwise noted.

Calendar submissions should state time, date, place, sponsor, title of event, name of speaker(s) and affiliation, and admission cost. Quality promotional photographs with descriptions are welcome. Send items to Judy Ruhland at Box 1070 (or via fax: 935-4259). Submission forms are available by calling 935-4926.

The deadline for all entries is noon Tuesday one week prior to publication. Late entries will not be printed. The Record is printed every Thursday during the school year, except holidays, and monthly during the summer. If you are uncertain about a deadline, holiday schedule, or any other information, please call 935-4926.

Three fine arts professors display sabbatical works in gallery exhibit

Works by three School of Fine Arts professors will be on display at the Gallery of Art from Nov. 19 to Jan. 3.

The show, titled "Sabbatical Works," features printmaker Joan Hall, painter William Kohn and illustrator Jeffrey Pike. An opening reception, which is free and open to the public, will be held from 5 to 7 p.m. Friday, Nov. 19, in the gallery. All sabbaticals took place during the 1992-93 academic year.

Hall, affiliated with the School of Fine Arts since 1978, is an associate professor and printmaker who works with handmade paper. During her sabbatical she explored the media of watercolor, painting and drawing while in Paris at the Cité Internationale des Arts and as a visiting artist in Hawaii.

Kohn, who spent a year in Oaxaca, Mexico, will exhibit his large-scale paintings of Mexican landscapes and ancient Mayan monuments. Kohn, a professor who has been at the University since 1963, has a companion exhibit of his works from Oaxaca at Eliot Smith Contemporary Art Gallery in St. Louis. That exhibit runs through Nov. 28.

Pike, an associate professor and associ-

ate dean, spent his sabbatical working on two projects. In collaboration with photographer and writer Bart Parker, playwright Carson Becker and School of Fine Arts graphic designer Sarah Spurr, Pike created illustrations to a fictionalized autobiography based on the famous letters of medieval lovers Heloise and Abelard. That work, titled "The Last Number of the Night," is being written by Becker and Parker and designed by Spurr. Pike also will exhibit a series of illustrations titled "Another Annunciation," which he created on sabbatical. Pike joined the University in 1983.

Artists lecture

A series of lectures will be held in conjunction with the exhibit. Hall will discuss her work at 12:10 p.m. Dec. 7, and Pike will discuss his work at 12:10 p.m. Dec. 9. Both talks will take place in the upper gallery. Kohn will discuss his work at 8 p.m. Dec. 2 in Steinberg Hall auditorium. All talks, as well as the exhibit, are free and open to the public.

The gallery is open from 10 a.m. to 5 p.m. weekdays and 1 to 5 p.m. weekends. The gallery will be closed Nov. 25 to 28, Dec. 24 to 26 and Dec. 31 to Jan. 2.

For more information, call 935-4523.

Sports**Women's Volleyball**

Last Week: NCAA Tournament: Washington 3 (15, 15, 15), Illinois College 0 (11, 9, 10); Washington 3 (15, 15, 11, 17), Wisconsin-Eau Claire 1 (3, 10, 15, 15); Washington 3 (15, 15, 15), Illinois Benedictine 0 (4, 6, 9)

This Week: NCAA Division III Semifinals vs. Rochester Institute of Technology, 5:30 p.m. (EST) Friday, Nov. 19, Huntingdon, Pa.; Championship Match, 8 p.m. (EST) Saturday, Nov. 20

Current Record: 42-2

For the fifth straight season, the volleyball team has earned a ticket to the NCAA Final Four. The Bears will advance to the semifinals, which will be held at Juniata College in Huntingdon, Pa. The Bears will face seventh-ranked Rochester Institute of Technology (41-7), while third-ranked Juniata (41-3) will meet second-ranked University of California, San Diego (24-9). Finals will be held on Saturday.

Last week, all four of last year's returning All-America selections — senior Amy Sullivan, St. Louis; senior Leslie Catlin, Lawrence, Kan.; junior Amy Albers, Washington, Mo.; and junior Anne Quenette, Springfield, Ill. — were chosen to the first-team all-Central Region squad and now are candidates for repeat All-America honors.

Men's Basketball

Last Week: No activity

This Week: Pointer's/Washington Tip-off Tournament vs. La Verne, 8 p.m. Friday, Nov. 19, Field House; Pointer's/Washington Tip-off Tournament, 6 or 8 p.m. Saturday, Nov. 20, Field House; vs. Millikin, 7:30 p.m. Tuesday, Nov. 23, Centralia, Ill.; at Rhodes, 7:30 p.m. Saturday, Nov. 27, Memphis, Tenn.

The Bears open the 1993-94 season with the Pointer's/Washington Tip-off Tournament. Teams competing are the University of La Verne and Midwest powers Illinois Wesleyan University and DePauw University. Washington plays La Verne at 8 p.m. on Friday after Illinois Wesleyan and DePauw meet at 6 p.m. The two winners meet at 8 p.m. on Saturday following the consolation game at 6 p.m.

Washington is seeking a school-record 10th consecutive winning season.

Women's Basketball

Last Week: No activity

This Week: DePauw University Tip-Off Tournament vs. Illinois Wesleyan, 3 p.m.

Saturday, Nov. 20, Greencastle, Ind.; vs. DePauw, 1 p.m., Sunday, Nov. 21, Greencastle, Ind.; vs. Blackburn College, 7 p.m. Tuesday, Nov. 23, Carlinville, Ill.; Fifth Annual Washington University Invitational vs. Redlands, 7:30 p.m. Friday, Nov. 26, Field House; Consolation/Championship Games, 5:30 p.m./7:30 p.m. Saturday, Nov. 27, Field House

Season Record: 0-0

The Bears open the 1993-94 at DePauw University this weekend. The Red and Green return just two starters from last year's 22-4 squad in senior guard Sarah Goldman, Nashville, Tenn., and senior center Brooke Kenyon, Phoenix, Ariz., but are laden with both young talent and experienced veterans.

Cross Country

Last Week: at NCAA Division III Midwest Regionals (Oshkosh, Wis.): Men's Finish: 11th of 24; Women's Finish: 16th of 20

Next Meet: Season Complete

The cross country teams performed well at the NCAA Division III Midwest Regionals last Saturday. The men, in particular, had a stellar outing, led by sophomore Asa Flanigan, Kankakee, Ill. Flanigan placed 35th out of 175 finishers with a eight-kilometer time of 27:01, and was just 18 seconds behind the final qualifier for the NCAA Division III Championships. Freshman Amy Chi, Olympia Fields, Ill., produced the women's top effort, placing 37th out of 148 finishers with a five-kilometer time of 19:59.

Swimming/Diving

Last Week: Men: Washington 129, Missouri-St. Louis 74; Washington 122, Millikin 82. Women: Washington 122, Missouri-St. Louis 64; Washington 119, Millikin 72

This Week: at Grinnell, 6:30 p.m. Friday, Nov. 19, Grinnell, Iowa; at Gleysteen Relays, 9 a.m. Saturday, Nov. 20, Grinnell, Iowa

Current Record: Men: 3-1, Women: 2-1

Both teams posted wins over Division II-rival Missouri-St. Louis and Division III stronghold Millikin. The women won seven of the 11 events versus UMSL and then swept each top-spot against Millikin. The men won eight of the 11 events against UMSL and six of 11 versus Millikin.



Christina Hinchcliff (left), a social work student who is doing her field practicum at Hawthorn Children's Psychiatric Hospital, speaks with Roberta Gardine, hospital director. Mental health is the largest curriculum area for master of social work students, with 118 local sites for field practicum projects. A recent grant will help the school conduct more studies of mental health services.

Grant will fund existing faculty research projects, launch new ones — from page 1

in the social services, is gaining recognition for its emphasis on interdisciplinary and field-based research. The grant will provide direct funding for faculty research projects, as well as build the school's capacity to launch additional projects.

"The center will enable us to link our faculty with experts nationally and at Washington University in the areas of psychiatry, economics and epidemiology," says Proctor. "We will work closely with consultants from mental health research centers at the

University of California, Berkeley, John Hopkins University and Harvard University."

Proctor is active in several national organizations with a focus on social work research. She is a board member of the Institute for Advancement of Social Work Research, a national organization based in Washington, D.C. In October, she was elected as chairperson of the Group for the Advancement of Doctoral Education in Social Work.

"We were chosen for this center partially because of our close ties with state agencies, such as our ongoing collaboration with the Missouri Department of Mental Health," says Proctor. "We will have an advisory board to ensure that the center's research and training agenda correspond to the needs of public and private social services providers in Missouri."

The center's research will focus on the access, integration and effectiveness of mental health services for high-risk populations, including children, adolescents, poor and minority individuals and those in the community with severe and persistent mental disorders.

About one-third of the NIMH grant will support a study of the mental health needs of urban teenagers. Stiffman, the center's associate director, is principal investigator of the study, which will examine mental health services provided to 800 teenagers in four sectors — juvenile justice, public health, education and child welfare. Felton Earls, a professor of psychiatry and public health at Harvard University, also will be involved in the study.

During the next five years, the center will support the development of research proposals for five additional projects by social work professors at George Warren Brown. The professors and their projects are: Martha Ozawa, Ph.D., who plans to study the role of the Social Security supplemental income program in funding mental health services for children with mental illness and retardation; David Gillespie, Ph.D., and Michael Sherraden, Ph.D., who will address the coordination and integration of mental health delivery systems in St. Louis; Proctor and Aaron Rosen, Ph.D., who will study how the decision support process influences the ability to evaluate treatment results in Missouri community mental health care agencies; Proctor and Nancy Morrow-Howell, Ph.D., associate professor of social work, who will study how institutions plan the discharge of psychiatric patients; and Brett Drake, Ph.D., assistant professor of social work, who will study the mental health needs of adolescent parents, including how existing services are used.

Proctor says the center will help the school and its faculty move toward a long-held goal of increasing its emphasis on mental health research. She points out that mental health is now the largest curriculum area for master of social work students in the school, with more than 13 specialized courses and 118 local sites for student field "practicum" projects in mental health areas.

— Gerry Everding

Roller-coaster relationship explored — from page 1

Author of more than 100 articles, West's contributions to opinion pages and magazines include pieces on black anti-Semitism, gay rights and the social virtues of rap. He is a frequent guest on TV talk shows.

Hired in 1988 to revive Princeton's Afro-American Studies Program, West has "nurtured what even its rivals concede is the best program of its kind in the nation," according to Time magazine. West, who graduated from Harvard University magna cum laude with a degree in Near Eastern languages and literature, received his doctorate in philosophy from Princeton University. He taught at the Yale University Divinity School and Union Theological Seminary before taking his post at Princeton and was recently the W.E.B. Du Bois Lecturer at Harvard University.

Cornel West

West's lecture is co-sponsored by AFAS, American Culture Studies Institute, Assembly Series, Conference on Black and Jews, Department of History, Mortar Board, George Warren Brown School of Social Work and Student Union. For more information on the lecture, call 935-4620.

The goal of "Blacks and Jews: An American Historical Perspective" is to examine elements of cooperation and conflict between Jews and blacks in a format that will appeal to scholars, students, staff and residents of the St. Louis community, according to Grant, who has been organizing the conference for the past five years. While the papers will acknowledge the two groups' relationship, the works primarily will focus on events from the turn of the century through the 1980s — detailing moments of cooperation and antagonism, she says.

The conference is sponsored by AFAS, American Culture Studies Institute, Jewish and Near Eastern Studies, as well as the departments of History, Education and Political Science.

For more information on the conference, call 935-5690.

Zeitgeist to perform contemporary works

Zeitgeist, a four-piece ensemble dedicated to playing the music of contemporary composers, will perform at 8 p.m. Sunday, Nov. 21, in Steinberg Hall auditorium.

Zeitgeist, which means "spirit of the times," has commissioned the works of modern composers for 15 years. The ensemble's repertoire includes more than 180 compositions, half of which were commissioned specifically for Zeitgeist. Composers such as Terry Riley, John Cage and Frederic Rzewski have written for the group.

In addition to commissioning new works and performing, the group conducts educational programs, using the teaching skills of its individual members to communicate the history, meaning and sense of

contemporary music. Zeitgeist also has collaborated on numerous projects with dancers, composers, poets and filmmakers.

The foursome includes: Jay Johnson, vibraphone and percussion; Joe Holmquist, marimba and percussion; Bob Samarroto, clarinet and saxophone; and Tom Linker, piano and synthesizer.

Zeitgeist has performed worldwide, in locations such as Cologne, Lisbon, Berlin, Copenhagen and Gothenberg. The ensemble also has produced five recordings, titled "Zeitgeist," "Duplex," "Zephyr," "Too Many" and "Zeitgeist Live!"

Tickets are \$10 for the general public and \$6 for students and senior citizens. The event is co-sponsored by the New Music Circle. For more information, call 727-1568.

New Nicholson play challenges student actors

"Blue Moon Rising," a new play by James Nicholson, will premiere at 8 p.m. Dec. 2-4 and 2 p.m. Dec. 5 in the University's Drama Studio, Room 208 Mallinckrodt Center.

Nicholson, playwright-in-residence at the University, received the National Play Award twice and is a former playwright-in-residence at the Repertory Theatre of St. Louis. He received a grant from the Ucross Foundation to write "Blue Moon Rising," which will be presented by the Performing Arts Department.

The play, featuring student actors, follows three couples and one extra male as they escape their prom (circa 1964) to spend the night in the woods. Characters wander between time periods frequently throughout "Blue Moon." While in the woods, some of the characters temporarily become themselves 25 years later. The play then fast forwards to this group's 25th reunion, which takes place at a country club built on the site of the prom night woods. In another dramatic twist, some characters revert to their 18-year-old selves during the reunion, while others remain as adults. The play contains adult language and situations.

Nicholson notes that the play presents a special challenge to college-age actors. "I'm asking my cast to play both themselves and their parents, not to mention most stops in between," he says.

The seven cast members are: Judy, played by junior Caren Schmulen; Jerry, Judy's date (sophomore Ryan Patterson); Lece (junior Pascaline Rybalka); Augie, Lece's date (first-year student Jeff Gordon); Sandy (sophomore Alexis Chamow); Jeff, Sandy's date (junior Brad Walker); and McB (sophomore Alexander Gish).

The play is directed by Melanie Dreyer, artist-in-residence in performing arts and co-founder of the new theatre group called ShatterMask Theatre. Dreyer received her master's degree from the University in 1992.

Nicholson received his bachelor's degree from Washington University in 1968 and his master of fine arts degree in playwriting from Florida State University in 1973. He is author of 10 plays.

Tickets are \$7, with discounts for students and senior citizens. For more information, call 935-6543.

Interstellar dust grains topic of workshop

Scientists from around the world will gather Nov. 18-20 in Simon Hall at Washington University to discuss interstellar dust grains found in primitive meteorites.

The "Workshop on Isotopic Anomalies: Interstellar Grains in the Laboratory" is sponsored by NASA's Origins of Solar Systems Program. Washington University's McDonnell Center for the Space Sciences, a leader in the study of interstellar grains from meteorites, is hosting the workshop.

Interstellar dust grains consisting of diamond, silicon-carbide, graphite and aluminum oxide have been discovered in meteorites. It is generally believed that these grains originated in stellar atmospheres and survived interstellar travel and the formation of the solar system before their incorporation into meteorites.

Ernst Zinner, Ph.D., research professor in the Department of Physics and the McDonnell Center for the Space Sciences, organized the meeting. Zinner says that studying these grains provides information on nucleosynthesis and the evolution of stars as well as on conditions in interstellar space, molecular clouds and the early solar system.

For a better understanding of the information carried by these interstellar grains, Zinner has invited scientists from many different disciplines to present papers and participate in discussions. The various aspects of interstellar grains to be discussed include grain formation processes, interstellar processes affecting the growth and destruction of grains, star and planet formation, chemical processing in the early solar system and isotopic geochemistry.

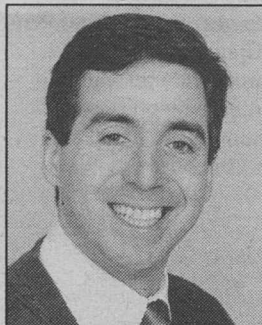
For more information, call 935-6240.

News Analysis

News Analysis contains excerpts from the For Expert Comment service. The service, which provides timely faculty comments to media across the country, is distributed by the Office of University Communications.

NAFTA: Free trade won't hurt American jobs, says scholar

Russell Roberts, Ph.D., is director of The Management Center at the John M. Olin School of Business at Washington University. An expert on free trade, he has been teaching the economics of international trade for 15 years. A non-traditional book by Roberts titled *The Choice: A Fable of Free Trade and Protectionism* is scheduled for release on Dec. 7, Pearl Harbor Day, by Prentice-Hall Inc.



Russell Roberts

Roberts, who has won several teaching awards, recently engaged in a debate with a United Auto Workers official, where he argued that passing the North American Free Trade Agreement (NAFTA) would benefit workers.

He comments here on the agreement.

Individuals who assert that NAFTA will cost Americans jobs should realize that the talk of "jobs, jobs, jobs is just a smoke screen for theft," says Roberts. "If restricted trade puts a \$500 premium on American cars, that gives auto workers extra cash. But it takes money from other Americans. Protection then is not in the name of Americans, it's in the name of only those few auto workers."

Instead of boosting the auto industry, those dollars can go to expanding American industries that other countries can't match, he says. "That ultimately means more and better paying jobs."

Americans need to understand that U.S. industry can do many things better than any other country, but it can't do everything equally well, Roberts says.

"When we are willing to sacrifice industries that are no longer profitable, we are able to specialize in other industries, make those products better than anyone and grow richer. Thriving international trade won't hurt American jobs. Failing to pass NAFTA will send a signal to the world that we're not interested in participating in the competitive international economy. Ultimately, that will devastate our standard of living."

For The Record

For The Record contains news about a wide variety of faculty, student and staff scholarly and professional activities.

Of note

Barry A. Hong, Ph.D., research associate professor of medical psychology in psychiatry, and **Carol S. North**, M.D., assistant professor of psychiatry, received a \$176,583 grant for 18 months from the James S. McDonnell Foundation. The grant is for a project to establish a community-based crisis intervention system to assist flood victims and disaster workers in the St. Louis region. ...

Rahul K. Nath, M.D., resident in plastic surgery, received a \$4,727 Educational Foundation Grant from the Plastic Surgery Educational Foundation for a project titled "Homeobox Gene Regulation of Fetal Wound Repair." ...

Samantha Rainwater, Central Stores manager, has been awarded the designation Certified Purchasing Manager by the National Association of Purchasing Management (NAPM). Rainwater earned the designation by passing four examinations, achieving certain levels of formal and continuing education, having years of on-the-job experience and contributing time to the profession via published articles or teaching. She is a member of the National Association of Educational Buyers, an affiliate organization of the NAPM. ...

Sheng Kwei Song, Ph.D., postdoctoral research associate in chemistry, received a \$27,000 fellowship for one year from the American Heart Association, Missouri Affiliate. ...

Paul Spearman, M.D., postdoctoral fellow in molecular microbiology, received a 1993-96 Scholar Award from the American Foundation for AIDS Research.

Speaking of

Matthew K. Arthur, manager of residential computing, delivered a presentation on "Supporting Information Resources Within Residential Communities" during EDUCOM '93 held in Cincinnati. ...

During the Association of Third World Studies' annual meeting held in Tacoma, Wash., **Eugene B. Shultz Jr.**, Ph.D., professor emeritus of technology and human affairs, presented papers on "Coping With Deforestation and Land Degradation in Sub-Saharan Africa: Development Strategies Centered on Rural Women" and "Free vs. Fair Trade Between the United States and Mexico: Issues and Positions." He wrote the latter paper with Jolanda and David Westerhof-Shultz of Veritas International based in Elmhurst, Ill. Jolanda Westerhof-Shultz received her master's degree in international affairs from the University in 1992.

On assignment

Ralph G. Dacey Jr., M.D., professor and chair of neurosurgery, was named president-elect of the Congress of Neurological Surgeons, a national neurosurgical organization composed of more than 3,000 members. Founded in 1951, the congress promotes the continuing education of younger neurosurgeons in the United States and abroad. Dacey served as treasurer of

the congress from 1990-93. His term as president will begin in October 1994. ...

Deborah Shure, M.D., associate professor of medicine, was elected the 1995-96 president of the American College of Chest Physicians. She also is a regent of the college, an organization composed of 16,000 pulmonologists, cardiothoracic surgeons and critical care specialists.

Etc.

Joe Deal, dean of the School of Fine Arts, was among the invited guests who witnessed Jane Alexander's installation as chair of the National Endowment for the Arts in Washington, D.C. During the program he also observed the awarding of the 1993 National Medal of Arts to 11 internationally recognized American artists and to Walter and Lenore Annenberg, patrons of the arts. ...

Paintings by **Bill Kohn**, professor of art, were exhibited in Oaxaca, Mexico. The exhibition was sponsored by the Oaxaca State Institute of Culture and the American Embassy. All of the paintings are based on archaeological sites in the valley of Oaxaca.

Guidelines for submitting copy:

Send your full name, complete title, department, phone number and highest-earned degree, along with a typed description of your noteworthy activity to For The Record, c/o Carolyn Sanford, Campus Box 1070, or p72245cs@wuvmd.wustl.edu. Items must not exceed 75 words. For information, call Sanford at 935-5293.



The John B. Ervin Scholars and friends of the John B. Ervin Scholarship Program recently dedicated a bench in Brookings Quadrangle to honor the late John B. Ervin, former dean of the School of Continuing Education. Washington University established the program in early 1987 in tribute to Ervin, who died Oct. 7, 1992. During the dedication ceremony, James E. McLeod, dean of the College of Arts and Sciences and director of the scholarship program, delivered remarks to the Ervin family and others. The bench is located northwest of the entrance into Holmes Lounge, Ridgley Hall.

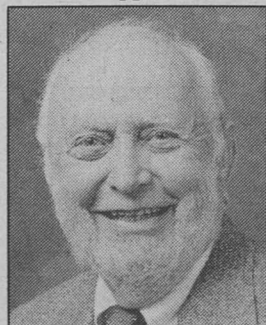
Douglass North meets Clinton to back NAFTA

Nobel Laureate Douglass C. North, Ph.D., Henry R. Luce Professor of Law and Liberty, recently met with President Bill Clinton at the White House to show his support of the North American Free Trade Agreement (NAFTA).

North is one of two American economists who were awarded the Nobel Prize in Economics for 1993 last month. He shares the prize with Robert Fogel of the University of Chicago. North travels to Sweden to accept his prize in December.

Clinton telephoned North to invite him to the White House gathering, which was part of "Prominent Americans Day." North joined former President Jimmy Carter, several other Nobel Laureates

and officials from previous administrations in support of NAFTA.



Douglass North

Henry Kissinger, spoke in support of the free-trade agreement in the East Room of the White House.

The event included lunch with the president and dignitaries, then a press conference introducing the visiting officials. Several of the guests, including Carter and Nobel Laureate

Campus Authors

The following is a recent release available at the Campus Bookstore in Mallinckrodt Center on the Hilltop Campus or at the Washington University Medical Bookstore in the Olin Residence Hall. For more information, call 935-5500 (Hilltop Campus) or 362-3240 (School of Medicine).

Karl Kautsky: *Marxism, Revolution & Democracy* is the title of a new book by **John H. Kautsky**, Ph.D., professor emeritus of political science and grandson of Karl Kautsky. Following the generation of Marx and Engels, Karl Kautsky was the leading theorist, interpreter and popularizer of Marxism. In numerous publications he fought against Eduard Bernstein's revisionism and Rosa Luxemburg's radicalism. In the last two decades of his life he was a bitter enemy of Leninism. The book includes specialized studies of certain aspects of the theorist's political thought as well as his role in politics. The six chapters cover such topics as the divergent views of Lenin and Kautsky on the role of intellectuals in the labor movement, Kautsky's complex concept of revolution as it emerges notably from his book *The Road to Power* and Kautsky's thoughts on imperialism. An introductory essay explores the consistency of Kautsky's ideas and comments on his relevance today. (Transaction Publishers: New Brunswick, N.J., and London)

Opportunities & personnel news

Hilltop Campus

The following is a list of positions available on the Hilltop Campus. Information regarding these and other positions may be obtained in the Office of Human Resources, Room 126 North Brookings Hall, or by calling 935-5990.

General Office Assistant

940103. *Career Center*. Requirements: High school graduate, some college preferred; typing 45 wpm with accuracy; ability to meet deadlines, set priorities, cope with interruptions; good organizational skills; excellent with details; good telephone and interpersonal skills. Clerical tests and three letters of recommendation required.

Network Technician

940116. *Olin Library*. Requirements: Associate's degree or similar technical credential in electronics, plus three years experience supporting networking and communication systems in an organizational setting, or a similar combination of education and experience; comprehensive knowledge of serial communications technology, including installation and maintenance of terminals, modems and RS-232 interfaces; comprehensive knowledge of ethernet networking technology, including installation and maintenance of transceivers, repeaters, hubs and twisted-pair station wiring; knowledge of TCP/IP network administration (SNMP), UNIX system administration and PC hardware and software. Resume and three letters of recommendation required.

Department Secretary

940117. *Alumni and Development Programs*. Requirements: Specialized secretarial and business training; three years general office experience, inclusive of word processing experience; strong verbal and written skills and a pleasant, professional manner with co-workers, volunteers and outside vendors; strong organizational skills and ability to apply these skills toward accomplishing multiple priorities with minimum supervision; typing 50 wpm with accuracy; available to work overtime, as necessary. Clerical tests and three letters of recommendation required.

Administrative Assistant

940119. *Alumni and Development Programs*. Requirements: College degree or equivalent knowledge; specialized secretarial, business and event planning training and/or experience; strong attention to detail; ability to work with multiple deadline priorities and individuals at all levels in a consistent and decisive manner; good command of grammar, punctuation, telephone skills, as well as Macintosh software and systems; must be able to work evenings and weekends on occasion with minimal supervision; handle confidential information regarding staffing and volunteers in a loyal and responsible manner; mature; well-groomed; must have a pleasant personality; typing 40 wpm with accuracy. Clerical tests and three letters of recommendation required.

Director of External Affairs

940120. *School of Law*. Requirements: Bachelor's degree, J.D. preferred; strong interpersonal skills and the ability to establish and maintain excellent relations with alumni, faculty, the development office, the publications office and students; demonstrated superior writing and editing skills; highly desirable to have knowledge of legal education and/or the legal profession and/or experience in higher education administration. Resume and three letters of recommendation required.

Deputy Director

940121. *Electric Power Research Institute (EPRI)*. Requirements: Bachelor's degree, master's degree preferred; five years of increasing experience in management of water and/or experience in conducting, managing and approving research efforts

and project management. Also desired: Publication in professional journals; active in professional associations and membership on committees related to science; graduate studies in sanitary, chemical, environmental or electrical engineering; registration as a professional engineer and national reputation in the water/waste water industry; a broad understanding of the environmental, technical and financial needs of cities, etc. Resume and three letters of recommendation required.

Library Assistant Weekend/Evening Manager

940127. *Olin Library*. Requirements: Two years of college or equivalent study/work experience; library work experience desirable; supervisory experience desirable; interpersonal skills, including the ability to communicate effectively with a diverse public and staff combined with a strong service orientation essential; computer skills desirable; familiarity with automated circulation system, preferably NOTIS, desirable; familiarity with audio-visual and photocopier maintenance desirable; ability to work weekends and flexible hours, including other evening hours as needed. Resume and three letters of recommendation required.

Department Secretary

940128. *Alumni and Development Programs*. Requirements: Specialized secretarial and business training; three years general office experience, inclusive of word processing experience; strong verbal and written skills and a pleasant, professional manner with co-workers, volunteers and outside vendors; strong organizational skills and ability to apply these skills toward accomplishing multiple priorities with minimum supervision; available to work overtime, as necessary; typing 40 wpm with accuracy. Clerical tests and three letters of recommendation required.

Assistant/Associate Director of Development

School of Engineering and Applied Science. Washington University is seeking a talented and qualified individual to serve, depending upon qualifications, as either assistant or associate director of development for its School of Engineering and Applied Science. This is a challenging and permanent position in the Office of Alumni and Development Programs. Preferred qualifications include a bachelor's degree and three years experience in alumni/development or closely related work. Preference will be

given to individuals with development experience in higher education. Salary is dependent on experience and qualifications. Some travel is required. Excellent writing, speaking, listening and organizational skills are essential. Send letter of application, resume and three references to: Director of Development, School of Engineering and Applied Science, Campus Box 1163, Washington University, One Brookings Drive, St. Louis, MO 63130-4899.

Medical Campus

The following is a partial list of positions available at the School of Medicine. Employees who are interested in submitting a transfer request should contact the Human Resources Department of the medical school at 362-4920 to request an application. External candidates may call 362-7195 for information regarding application procedures or may submit a resume to the Human Resources office located at 4480 Clayton Ave., Campus Box 8002, St. Louis, Mo. 63110. Please note that the medical school does not disclose salary information for vacancies, and the office strongly discourages inquiries to departments other than Human Resources.

Secretary III

940222-R. *Radiology*. Requirements: High school graduate or equivalent with post-high school training; emphasis on administration, secretarial sciences, language arts, planning and accounting; familiarity with graphics software; experience with Macintosh, Microsoft Word, Excel and Filemaker; typing 65 wpm.

Secretary I

940230-R. *Transportation*. Schedule: Part-time, 20 hours per week, usually 9 a.m.-1 p.m., but hours may switch as needed. Requirements: High school graduate or equivalent; good communication and customer-service skills; must have WordPerfect and spreadsheet experience; some knowledge of accounting procedures; typing 60 wpm.

Medical Research Technician

940307-R. *Neurology*. Requirements: Bachelor's degree in biology, biochemistry or related field, skills in biochemistry and experience in neuroscience preferred.

Medical Research Technologist

940311-R. *Pathology*. Requirements: Bachelor's degree in a scientific field with

one year experience in a biochemical research laboratory. Will be performing and analyzing experiments in molecular biology and immunology.

Library Assistant II

940314-R. *Medical Library*. Schedule: 4-11 p.m. Fridays; 8:15 a.m.-6 p.m. Saturdays; 4 p.m.-midnight Tuesdays, Wednesdays and Thursdays. Requirements: One year college with some library experience preferred; mature work ethic; service oriented.

Lab Tech Research

940324-R. *Pharmacology*. Requirements: Some course work beyond high school; good binocular vision in working with microscope and performing microsurgery; fine motor skills with a steady hand. Will be working with laboratory mice.

Clinic Administrator

940326-R. *Obstetrics and Gynecology*. Requirements: Bachelor's degree or equivalent and ARDMS registered in obstetrics and gynecology with five years clinical experience; ability to work effectively with people in a fast-paced patient environment.

Med Lab Tech I

940328-R. *Pediatrics*. Schedule: 3-11:30 p.m. Mondays-Fridays with rotating weekends and holidays. Requirements: Two years of job-related college course work and certification or pending certification by ASCP, NCA, HEW or other accepted registry, including military medical laboratory training as a medical lab tech.

Administrative Coordinator

940334-R. *Pediatrics*. Requirements: High school graduate or equivalent with at least seven years experience, including four years in a medical setting and advanced secretarial training; good oral and written communication skills; computer experience; typing 70 wpm.

Medical Research Technician

940337-R. *Pediatrics*. Requirements: High school graduate or equivalent with at least three years experience or the equivalent combination of academic background and experience. Bachelor's degree in chemistry, biochemistry or biology preferred.

3-D movie may impact how geophysics is taught — from page 1

the stress can result in a fold or brittle rupture within the Earth.

Wyssession selected a point 600 kilometers (373 miles) deep as the site of his simulated earthquake and created seismograms from the surface down to the core-mantle boundary, 3,480 kilometers (2,162 miles) beneath the Earth's surface. (His most recent research has focused on modeling the core-mantle boundary region through the use of seismic waves, a method similar to a medical CAT scan.)

To calculate the movement of seismic waves from the earthquake on an interior global scale, Wyssession used a method called the "summation of torsional normal modes of free Earth oscillations." He likens the method to calculating the modes of vibration that occur when striking a musical instrument such as a violin string or bell.

"An earthquake is like hitting a bell," says Wyssession. "The Earth vibrates just the way a bell vibrates. It has distinct modes of vibration."

More than 24,647 modes of Earth oscillations — or harmonics — were calculated, and 72,846 synthetic seismograms were computed on a grid of locations within the Earth.

"We created a three-dimensional structure," says Wyssession. "Two of the dimensions are slices through the Earth.

The third is time. They describe a history of shaking in the Earth."

Both P waves (primary or acoustic waves) and S waves (secondary or shear waves) have been identified in earthquakes. Wyssession likens P waves to the movement produced by giving a child's toy slinky a straightforward shake; the wave passing through works like the domino effect. Giving the slinky a lateral shake produces the motion associated with S waves.

Wyssession modeled shear waves — in particular, SH or shear horizontal waves — for display in his movie. Modeling SV or shear vertical waves, which are intimately coupled with P waves, would have produced a blurred movie, he says. A computer algorithm has not yet been written to enable modeling of all of the waves associated with earthquakes.

Wyssession's calculations required four months of continuous computations on the fastest Sun SPARC10 computers and over two Gbytes of computer disk storage space. He began his work in January 1993 and achieved success in May during his first attempt to generate a movie.

"I was flabbergasted it actually worked," recalls Wyssession. "You go through months of computations with no real idea of whether or not it will work. When it actually gave the result, I was surprised both that it worked and that it worked on

the first try. It reaffirmed that all of the mathematics we work with make sense."

Wyssession said he believes the movie will have "tremendous educational value. I've had numerous requests from seismologists from around the country to use the video in teaching geophysics."

Being able to see how seismic waves move within the Earth following an earthquake also will help scientists to further research the Earth's composition, he said.

"So much of science is quantitative," he says. "We use mathematical equations and computer programs. But the process of thinking where to go next in our research requires a great deal of creativity. It's similar to the work of an artist. The actual work is very detailed, but figuring out what to paint is very creative. This movie will help us to figure out new ways to interpret the interior of the Earth."

Wyssession's next step is to further refine his computer-generated movie by including finer detail in the Earth, he says.

He likens his work and that of other geophysicists who uncover mysteries beneath the Earth's surface to playing a detective game.

"You know stuff is down there, but you can't get at it," says Wyssession. "We need to pick out as many clues as we can to solve the mystery. We're fascinated with what the Earth is made of and how it runs."

— Brenda Murphy